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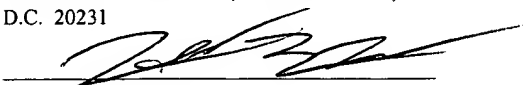
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System and Method for Connecting a Healthcare
Business to a Plurality of Laboratories

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Priority Claim

This application claims benefit of priority of U.S. provisional application Serial No. 60/167,532 titled "System and Method Enabling a Distributed Object-to-Relational Application Framework", filed December 1, 1999, whose inventors were Robert Yeager,
5 Kurt Schurenberg, and Robin Johnson.

Field of the Invention

The present invention relates to the field of distributed systems and applications, and more particularly to a system and method for connecting a healthcare business to a
10 plurality of laboratories, e.g., in order to electronically order lab tests and receive test results.

Description of the Related Art

The healthcare industry has historically suffered from information flow and
15 workflow fragmentation. Information is typically exchanged among various parties involved in healthcare, such as physicians, hospitals, insurers, laboratories, employers, and others, using paper-based methods. As is well known in the art, such methods are inherently labor-intensive, inefficient, and error prone. Although efforts to modernize healthcare by utilizing electronic information networks have been undertaken, so far these
20 efforts have failed to achieve the promised integration of members of the healthcare industry.

One area of healthcare in particular that has historically suffered from inefficiencies pertains to laboratories, such as labs that perform clinical tests ordered by caregivers. From collecting a specimen to reporting results, laboratories traditionally have been burdened
25 with heavy user intervention and paperwork. Specimens along with the laboratory orders must pass through many hands before tests can be performed. Numerous pieces of paperwork must be properly filled out and forwarded to the performing lab to ensure that the proper tests are performed on the proper specimen and to ensure that necessary clinical information accompanies the order. The integrity of the results returned to the

caregiver is based on the ability of the caregiver and the performing lab to properly submit accurate test requisitions, track specimens, and synchronize reported results with submitted requisitions. Any breakdown at any point in this workflow can cause specimens to become lost, tests to be delayed, and results to be erroneous. The situation is further complicated when a caregiver interacts with multiple laboratories.

In addition, for laboratories to continue generating revenue, accurate and complete billing information must accompany the laboratory order. Without the necessary information, laboratories are faced with absorbing the costs of their services. Furthermore, billing information must be received by the laboratory in a timely fashion in order for the collection process to be initiated and completed within the given amount of time according to regulations.

Figures 1A - 1B are a flowchart diagram illustrating a typical workflow among various parties, as known in the prior art, when performing one or more laboratory tests for a patient. Several disadvantages are associated with such a workflow. To name a few:

- Hand writing the paper requisition form is time-consuming and error prone.
- Different requisitions have to be completed for orders that are to be sent to different laboratories.
- Patient may lose the paper requisition form(s) en route to the specimen collection station.
- Phlebotomist and accessioning clerks must visually match the specimens to the requisitions without electronic verification, possibly resulting in incorrect specimen identification.
- No electronic verification of information prior to specimens and requisitions being picked up by the courier.
- Result delivery traditionally is not timely. Laboratories may utilize fax machines, teleprinters, mail, courier services, or phone calls to deliver results. However, the

results are not usually available to the customer as soon as they are entered in the laboratory's laboratory information system.

- Lab results which are misplaced, destroyed, or not received as scheduled, must be retrieved from the laboratory information system and delivered to the ordering physician by the laboratory.
- Paper requisitions must be manually maintained to keep track of the patient's lab orders, possibly resulting in misplaced orders.
- Patient may supply incorrect insurance information, possibly resulting in inability of lab to be reimbursed for services.
- Preprinted requisitions have to be stocked and become outdated, listing tests which have been discontinued or modified.

It would be desirable to provide a system that addresses problems such as those described above, by reducing the amount of paperwork required to prepare and submit accurate laboratory requisitions while, at the same time, providing a convenient method for capturing, reviewing, and storing clinical and non-clinical information. It would also be desirable to design the system to allow for positive specimen identification and decreased turnaround time of results reporting. It would also be desirable for the system to enable caregivers to efficiently submit requisitions to multiple laboratories, using a common interface. It would also be desirable for the system to provide user support, such as test code entry, for laboratories that are not electronically connected to the system.

Summary of the Invention

One embodiment of the present invention comprises a system and method for connecting a healthcare business to a plurality of laboratories. The system includes a client application which executes on a workstation, e.g., at a physician's office or other business. Using this application, a user may place a laboratory order for a patient. In one embodiment, the laboratory system may utilize a Global Master Patient Index (GMPI) for maintaining patient record information across multiple healthcare sites. Thus, this GMPI information may be used in retrieving the appropriate patient record.

User input specifying general requisition information is received, such as contact information for the patient, guarantor information, etc. Billing information may also be received. If a requisition was previously created for the specified patient, relative information from that requisition may populate the appropriate user interface fields.

User input specifying diagnosis codes for the requisition may also be received. The user may enter a list of diagnosis codes, such as ICD-9 codes that specify the caregiver's diagnosis for the patient. The user may also enter a list of test codes specifying the desired lab tests to perform on the patient specimen(s).

User input specifying a list of labs to whom to electronically send the requisition may also be received. In the preferred embodiment, the system is operable to send requisitions to a plurality of labs. User input specifying a list of caregivers to whom to electronically send the results of the lab tests may also be specified. User input specifying other information for the requisition may also be received, such as lab instructions, information regarding the patient specimens collected, etc.

After the requisition information has been entered, the requisition may be validated by the system. If there are errors in the information entered for the requisition, an error message may appear, and the user may be required to correct the errors. Otherwise, the requisition information may be stored. The user may later use a menu option to select and electronically send the requisitions, e.g., by interfacing a middleware server which interfaces with the system for each laboratory which receives the requisitions.

Brief Description of the Drawings

A better understanding of the present invention can be obtained when the following detailed description of the preferred embodiment is considered in conjunction with the following drawings, in which:

Figures 1A - 1B (prior art) are a flowchart diagram illustrating a typical workflow among various parties, as known in the prior art, when performing one or more laboratory tests for a patient;

Figure 2 is a block diagram illustrating an exemplary Health Data Network (HDN) including electronically connected healthcare businesses that may utilize the laboratory application described herein;

Figure 3 illustrates one embodiment of a system employing a middleware server to facilitate the integration of healthcare information;

Figure 4 illustrates a more detailed system based on the system of Figure 3 and illustrates the electronic routing of laboratory orders and results and the electronic verification of patient insurance eligibility;

Figure 5 is a flowchart diagram illustrating one embodiment of a method for electronically sending lab requisitions to laboratories and electronically receiving lab results; and

Figures 6 – 102 describe an exemplary laboratory application that uses the methods described herein.

Detailed Description of the Preferred Embodiments

Incorporation by Reference

The following reference is hereby incorporated by reference in its entirety as though fully and completely set forth herein:

U.S. Patent No. 5,724,575 titled "Method and System for Object-Based Relational Distributed Databases", issued March 3, 1998, whose inventors were Michael K. Hoover, Barrick H. Miller, Kurt Schurenberg, and Richard A. Daigle.

U.S. provisional application Serial No. 60/167,532 titled "System and Method Enabling a Distributed Object-to-Relational Application Framework", filed December 1, 1999, whose inventors were Robert Yeager, Kurt Schurenberg, and Robin Johnson.

U.S. patent application Serial No. _____ titled "System and Method for Implementing a Global Master Patient Index", filed _____, whose inventors were Robert Yeager, Kurt Schurenberg, and Robin Johnson.

Figure 2 – Health Data Network

Figure 2 is a block diagram illustrating an exemplary Health Data Network (HDN) including electronically connected healthcare businesses that may utilize the laboratory application described herein. Several exemplary sites 60 are shown. Each site 60 may be associated with a health care organization, facility, or business, such as a physician's office, laboratory, health plan, hospital, etc. The individual sites 60 may be operable to share various types of information with each other, including laboratory information, such as laboratory requisitions, test results, etc. It is noted that the sites 60 shown in Figure 2 represent typical types of businesses found in a typical Health Data Network, and any of various other organizations may be present in other embodiments of a Health Data Network. Also, any number of organizations or businesses may be connected to the HDN.

As shown, each site 60 may utilize a computer system 62 and may also utilize one or more databases 64. Among other types of information, a database 64 may store patient record information. The use of patient information may differ for the various sites. For example, Physician's Office A (site 60B) may primarily use the patient records to view and update clinical information regarding patients' medical history, while the Health Plan (site 60D) may primarily use the patient records to manage insurance information for the respective patients.

In various embodiments, the information used by the various sites 60 may be stored at and retrieved from various locations. For example, information regarding a particular patient may be stored in the database 64E at site 60E, and the application running on computer system 62B at site 60B may be operable to retrieve the record from this database. As another example, the record may be stored in a database not specifically associated with any site 60. For example, if a person at site 60B creates a record, the record may be stored in a central database that stores patient record information for the various HDN Businesses.

In one embodiment, the computer systems associated with the various HDN Businesses may interface with a middleware server that facilitates the retrieval and update of patient records. For example, in response to a physician clerk's request to lookup a record for a patient at site 62B, an application running on computer system 62B may request the middleware server to retrieve any existing records for the patient, e.g., by specifying one or more identifiers associated with the patient, such as the patient's name, SSN, etc.

The middleware server may then retrieve the record, e.g., from a database at one of the sites 60 or from another database. In various embodiments, the middleware server may retrieve information in any of various ways.

Figures 3 and 4

Figure 3 illustrates one embodiment of a system employing a middleware server to facilitate the integration of healthcare information. It is noted, however, that any of

in any way appropriate. For example, a service provider may interface with a database resource using a database communication protocol.

Service providers are preferably implemented so that new service providers may easily be incorporated into the framework. In one embodiment, the client object server communicates with each service provider via a common CORBA interface. Thus, a new service provider may be added by simply implementing this interface, as appropriate for the respective resource.

Figure 5

Figure 5 is a flowchart diagram illustrating one embodiment of a method for electronically sending lab requisitions to laboratories and electronically receiving lab results. In step 200, a user requests to initiate a requisition. An exemplary user interface for entering lab requisition information is described below. In step 202, user information specifying the requisition is received, such as patient information, billing information, test code information, etc.

In step 204, the requisition information is transmitted to a middleware server, such as the COS server 110 described above. In one embodiment, the information may be stored temporarily and batched later, e.g., when a user requests all requisitions to be batched.

In step 206, the middleware server may transmit the requisition information to one or more laboratories specified in the requisition. As shown in the system of Figure 4, one or more intermediate servers may be involved in transmitting the requisition information.

Steps 208 – 216 may be performed for each lab specified in the requisition. In step 208, the lab receives the appropriate specimens corresponding to the requisition, i.e., the specimens upon which to perform the specified tests. The specimens are typically delivered to the lab by a courier. At the time the requisition information is entered in step 202, the system preferably prints labels to facilitate the proper handling and delivery of the specimens.

In step 210, the lab performs the test(s) specified by the requisition on the specimen(s).

In step 212, results of the tests performed may be entered into a laboratory information system for the lab. The middleware server (or an intermediate server) preferably interfaces with the laboratory information system and receives the lab results in step 214.

In step 216, the middleware server then routes the lab results to the appropriate caregivers, which may be the caregiver that initiated the requisition and/or another caregiver specified in the requisition information.

Laboratory Orders and Results Application

The remainder of this disclosure describes and illustrates one particular laboratory application that enables various healthcare sites, such as physician offices or hospitals, to connect to clinical laboratories, e.g., to electronically place lab orders and receive lab results.

After the user has successfully logged on to the lab orders and results system, the main window appears, as shown in Figure 6. In addition to standard user interface window components, the system main window has several application-specific components, including drop-down menus, an open items list, a desktop area, and a status bar.

Drop-down menus: The menu bar, located across the top of the system main window, provides access to all functions needed to use and maintain the system. Various menu items are described below.

Open Items list: The Open Items list, located on the left side of the system window, shows all items that are open. As the user works with various items, such as lab requisitions, patient records, etc., the items appear in the Open Items list. This feature allows the user to switch back and forth between different items without having to close the one the user is currently working on. Figure 7 illustrates an exemplary Open Items list. In this illustration, the following items are open: two requisitions under the Order

section, two patient records under the Patient section, and one patient group under the Report Group section. When the user log on to the system, the default item in the Open Items list is Main Menu. At the bottom of the list, there is a horizontal scroll bar that lets the user expand the view. To view an item from the Open Items list, the icon next to the item is clicked. The dark box around the item indicates that this is the item currently displayed on the system desktop.

Desktop: The desktop area, the large area located on the right side of the window, is where all screens of the application appear. When the application first opens, the system desktop is occupied by the Main Menu desktop menu, as shown in Figure 6. This desktop menu provides a graphic means of accessing the most frequently used functions of the application.

Status bar: The status bar, located at the bottom of the desktop area, has two message panels. On the left side is the log on status, which displays the username used to log on at the workstation and the name of the active Health Data Network (HDN) Business. In the example of Figure 6, the user doc4 is logged on at the workstation and Kennestone Hospital is the active HDN Business. On the right side is the lab results status, which displays the number of lab results that have not been viewed, i.e., new results electronically received from various labs but not yet reviewed, and the number of those results that are abnormal.

Functional Architecture

In one embodiment the system includes the following functional modules: Orders, Results, Patients, User, and Admin. Each of these modules is described below.

Orders Module

In one embodiment, there are twelve basic functions to the Orders module of the system:

- Create Standard Requisition

- [illegible]

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Creating a Requisition

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has not previously created a requisition for the selected patient, the field may be populated with the default value for the HDN Business the user is logged into.

A bill type of Client means that the client will be billed for services rendered. No additional billing information will be required.

5 A bill type of Patient means that the patient will be billed for services rendered. The user will need to enter guarantor information for the patient on the Billing page.

A bill type of Third Party means that an insurer will be billed for services rendered. The user will need to enter insured and payer information on the Billing page.

10 Requisition - General Page

 The General page includes basic patient demographic information, as well as a field for the Bill Type. As shown in Figure 10, The following fields may be included on the General page: Account # (The patient's account number); Address; Age; Birth Date; City ; First Name; Home Phone; Last Name; Middle Name; Operator ID (The identifier
15 for the operator creating the requisition); Sex; SSN; State; Zip.

 For various of the above fields, if the user selects an existing patient and the information exists in their record, the field may be automatically populated. Changes made to the field may also change the patient's existing record.

 The General page also includes a set of fields for entering Guarantor information,
20 e.g., for the name and contact information for the Guarantor. The fields are only active if the value in the Bill Type field is Patient. If the user has previously created requisitions for the selected patient where the Bill Type was set to Patient, the guarantor information from the last requisition may populate the fields. If the user has not previously created requisitions for the selected patient or if this is a new patient, the fields are blank. If the
25 user selects an existing guarantor and the information exists in their record, the fields are automatically populated.

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caregivers and assigning Client IDs to those caregivers. These assignments are made through the Manage Security/HDN Businesses and Manage Businesses/Providers functions, which are accessed through the Admin menu, as described below.

The system may automatically generate and assign a unique requisition number to each new requisition. If the user's system is configured for entering manual requisition numbers, the user has the option of changing the requisition number. This requisition number appears displayed on the title bar of the patient window.

The billing information fields may include the following fields, as shown in Figure 13:

<u>Field</u>	<u>Description</u>
Client ID	The ordering physician lab client identifier. If the ordering physician does not have a specific lab client ID, the default client ID of the active HDN Business is used.
Collection Date/Time	The date and time when the sample was collected.
Ordering Client	The physician ordering the tests. The physician must be a lab client or associated with a provider who is a lab client. If the patient's Primary Care Physician is a lab client, this field is populated with that physician's name.
Performing Lab	The lab that will perform the tests. This field is automatically populated with the default lab set up for the active HDN Business.
Primary Care Physician	The Primary Care Physician for the patient. If the user selects a client physician as the patient's Primary Care Physician, that physician will be used as the default Ordering and Referring physician on the Order Info page.
Referring Physician	The physician that referred the patient to the ordering physician. The ordering physician is automatically used for

this field. The referring physician does not have to be a client of the lab.

Requisition Number	The number assigned by the system for the requisition.
Requisition Status	The status of the requisition. The default status for a standard requisition is "entered". The default status for a future requisition is "inactive".
STAT	Checking this field indicates that the ordering physician wants STAT processing of this order

10 Requisition – Test Codes Page

The Test Codes page (see Figure 14) includes fields for entering laboratory test code information for the requisition, such as ICD-9 diagnosis codes and test codes.

ICD-9 stands for International Classification of Diseases version 9. ICD-9 coding is recommended for use in all clinical settings and is required for reporting diagnoses and diseases to all U.S. Public Health Service and Health Care Financing Administration programs. The user can retrieve ICD-9 and test codes from the user's Preferred List of codes by selecting Preferred List from the field control menu located next to the each input field.

The ICD-9 code list may include the following columns, as shown in Figure 14:

Description	The description of the ICD-9 Diagnosis Code
ICD-9 Code	The ICD-9 Diagnosis Code
User Description	A user-defined description for the ICD-9 Diagnosis Code

Test codes are used to specify what tests to perform on a patient. When the user prints or previews a requisition, the user will see the tests codes listed under the heading PROFILE/TESTS.

If a selected test code includes Ask-at-Order-Entry (AOE) questions, the first question in a series appears on the screen. The user may then answer the question and

the courier, who picks up the specimens, and the receiving laboratory to verify that the correct number of specimens and requisitions is received.

The Manifest window is shown in Figure 17. Clicking the Find Now button on the Manifest window without specifying any search criteria generates a listing of all requisitions with a 'Transmitted' status in the user's active HDN Business. The user can narrow down the results list by specifying one or more of the following search criteria: Stat Only; Inclusion; Sort Order; and Collection Date/Time Range.

The search results appear listed under the following column headings: Requisition No.; Patient Name; Patient Account #; Status; and Ordering Client. When the results of the user's search appear on the Manifest window, the user can selectively highlight those requisitions the user wants to include on the manifest. A manifest can be previewed or printed. The first page of the report is a header page that shows the name of the ordering provider and the search criteria that were used to generate the manifest. The rest of the report displays a list of all the requisitions in the manifest under the following column headings:

Control #
Pat. Account
Patient Name
Age
Sex
Hosp ID
Lab Ref.
Collection Date/Time
Urine Vol. & Hrs.
Test
Operator ID
Results Received

Orders: ABN Form

5 The ABN Form menu option enables the user to access an Advanced Beneficiary Notice (ABN) Form. An Advanced Beneficiary Notice is a printed statement that contains a list of tests not covered by the payer. By signing an ABN form, the patient or the insured accepts financial responsibility for those tests that are not covered by the payer. For example, Medicare has limited coverage. An ABN form is generated when the user enters information on the Requisition Test Codes page. If the test code the user enters is for a limited coverage test and the diagnosis code is not approved to cover that test, the system prompts the user to answer questions pertaining to the ABN and have the patient sign the statement that is printed at the bottom of the requisition.

The only search criteria required to generate this form is the payer or insurance company name. An optional header page can be included as the first page in the report showing:

- 15 Date and time when the form is printed
- Name of the user generating the form
- Comment line
- Search criteria used to generate the form

20 Once the ABN form is complete and signed by the patient, a copy of it can be sent to the lab along with the accompanying requisition and specimen.

Figure 18 illustrates the ABN Form window. A print preview of the ABN form may be displayed. Figure 19 illustrates the ABN Form Print Preview window.

25 Orders: Requisition Summary Report

The Requisition Summary Report menu option of the Orders menu enables the user to generate a list of requisitions for any date range, patient, ordering physician and requisition status. The user can also get a listing of all requisitions by just running the

In addition, the system prints each ordering physician's full name and Client ID at the beginning of each page in the report.

5

Orders: Find Test Codes

The Find Test Codes menu option of the Orders menu allows the user to locate test codes for labs. When selected, the Find Test Codes window appears, as shown in Figure 22. The user can enter the search criteria needed to best locate the test code the user wants to find and click Find Now to perform the search. The results appear in the list at the bottom of the window. The user can then locate and select the test code(s) the user wants to use. The user can also add test codes to a Preferred List of Test Codes.

Orders: Create Test Code

The Create Test Code menu option of the Orders menu allows the user to create new test codes for labs. When selected, a blank Test Code Details window appears, as shown in Figure 23, allowing the user to fill in the fields to create a new test code.

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Orders: ICD-9 Codes

The ICD-9 Codes menu option of the Orders menu allows the user to locate ICD-9 codes. When selected, the Find ICD-9 Code window appears, as shown in Figure 24. The user can enter the search criteria needed to best locate the ICD-9 code(s) the user wants to find and click Find Now to perform the search. The results appear in the list at the bottom of the window. The user can then locate and select the ICD-9(s) the user wants to use. The user can also add ICD-9 codes to a Preferred List of ICD-9 Codes.

Orders: Lookup Labs

The Lookup Labs menu option of the Orders menu allows the user to locate and select labs available for the user's use, e.g., to electronically send requisitions to the labs.

When selected, the Lookup Labs window appears, as shown in Figure 25. The user can click the Lab field control button and choose Select to display a list of available labs.

Orders: Manage Test Groups

The Manage Test Groups menu option of the Orders menu allows multiple tests to be grouped together for the purpose of ordering. Each test group is identified by a code and includes multiple tests. Being able to enter test group codes instead of individual test codes saves the user time and promotes accuracy when creating a requisition, e.g., by preventing erroneous test code from being entered and ensuring that required codes are not forgotten.

Test Groups also help the user simplify the task of creating requisitions by enabling the user to work with only those test codes that are specific to a group of patients in the user's practice. For example, the tests performed in an allergy/immunology practice will more than likely differ from those performed at an office specializing in cardiovascular diseases. Also, there may be multiple physicians in a practice, and each physician may handle specific types of patients who require different types of tests.

When the user chooses Manage Test Groups from the Orders menu, the Test Group Management window appears, as shown in Figure 26. From this window, the user can:

- List all test groups
- List all the test codes in a test group
- Create New test groups
- Add a new code to a test group

- Report Group Listing

These functions may be accessed through the Results drop-down menu, as shown in Figure 28, or the Results desktop menu (not shown). The Results functions pertain to reviewing and managing lab results. The Results functions are described below.

Results: View Results

The View Results menu option of the Results menu provides flexible, on-demand reporting capability for current and historical test data. This reporting feature enables a physician to track a patient's progress over a period of time. The View Results window is shown in Figure 29. This window enables the user to generate a listing of results based on the following search criteria: Patient Account; Patient; Analyte Codes; Report Codes; Profile Codes; Collection Date Range; and Result Date Range. The user may be required to enter

The Format Options page of the View Results window lets the user specify how the user want the results to be sorted. The report can be sorted in reverse chronological order or in chronological order.

The Results Report can be previewed or printed. The report may be printed and displayed in landscape mode with the following column headings:

Collection Date/Time

Requisition #

Test/Description

Result

Normal Range

Units

Specimen Type

Reported Date/Time

Viewed Only

Figure 32 illustrates the By Requisition page of the Find Result Reports window. From the By Requisition page the user can specify one or more of the following:

- 5 Requisition #
 Ordering Physician
 Referring Physician
 Ordering Provider (this field is populated by the system with the name of the
 currently active HDN Business)
- 10 Result Status

The results of the user's search are displayed under the following column headings:

- Req. #
- Acc. #
- 15 Patient Name
 Collection Date
 Status
 Abnormal
- Result Date
- 20 Ordering Physician Name
 Provider
 Lab
 Viewed

- 25 Once a list of result reports appears on the screen, the user can select one or more
of the results to view or print them, e.g., by highlighting the desired result(s) and clicking
the View/Print Result button. When the user clicks the View/Print Result button, a Print
Options window appears. This is where the user specifies whether the report should

show abnormal high / abnormal low flags next to each result and whether the user wants to preview or print the report.

5 Results: Cumulative Report

 The Cumulative Report menu option of the Results menu allows the user to review and print analyte results for a patient over a specified period of time. This reporting tool provides a physician the ability to examine a patient's progress over a period of time and simplifies the collecting, organizing and filing of test results for a
10 patient or patients. The main difference between Cumulative Reports and View Results Reports is in the way information is displayed. In a Cumulative Report the results for a single analyte appear listed horizontally over several date/time column headings. Also a Cumulative Report does not show requisition numbers or additional information on a test such as normal range, units and specimen type.

15 Figure 33 illustrates the Report page Cumulative Reports window. The user can specify the following criteria to narrow down the results of the search:

 Date Range

 Patient

 Patient Group

20 Shift

 Location

 Ordering Physician

 Report Group

25 Figure 34 illustrates the Format Options page of the Cumulative Report window. In the Format Options page, the user can select the following options to display a Cumulative report:

 Display Date/Time horizontally and Analyte Code vertically or vice versa

 Display results in chronological order or reverse chronological order

Title (An optional free text field where the user can enter a report title)

Figure 35 illustrates the Print Options page of the Cumulative Report window. In the Print Options page, the user specifies what additional supplemental information to include in the report. The user may select from the following three sections to include in the report.

Section I - Results Summary

Section II - Text and Notes

Section III - Performing Laboratories

The Results Summary section shows a listing of analyte results for a patient over a period of time. This is the most important component in a cumulative report. Results appear under their corresponding collection date/time column headings. Abnormal results are flagged with an H for high or L for Low.

The Text and Notes section of the report displays miscellaneous notes and remarks associated with test results. Text and notes can originate from report comments the user enters on the Additional Info page of a requisition or from an authorized user at the lab such as a lab director, medical technologist, pathologist or microbiologist. Non-numeric results such as "positive" or "abnormal" appear in the Text and Notes section. For example, if the results of a CBC test reveal a low red blood cell count, the lab technician may include a message along with the results such as: "R/O anemia. A complete blood count is used as a screening test for various states such as anemia, leukemia and inflammatory disease".

The Performing Laboratories section lists the names and addresses of all the laboratories from which the test results were obtained.

After selecting the report search criteria, format options and print options, the results can be previewed or printed. When the results are previewed, an Analyte Result window appears, as shown in Figure 36. Results are displayed one patient at a time. The top part of the display shows a heading with the patient's name, date of birth, sex and date

file for a particular patient record.

- Orders, which lists all laboratory tests performed on a patient.
- Result Reports, which lists the results of all laboratory tests performed on a patient.
- Diagnosis Codes, which includes a patient's diagnosis codes and their description.

Patient information is used by many other modules in the system and is shared within the user's organization as well as other organizations participating in the care of the patient. Therefore, great care should be taken to maintain the accuracy and integrity of this information. The system includes various features for helping to maintain data integrity, as described below.

Assuming the user has the proper security clearance, the Patient Records function of the system allows the user to carry out the following within each patient record:

- Enter and modify demographic information in a patient record
- 15 • Add, modify and remove name aliases in a patient record
- Add, modify and remove identifiers in a patient record
- Add, modify and remove employment records in a patient record
- Add, modify and remove guarantor information in a patient record
- Add, modify and remove medical data in a patient record
- 20 • Add, modify and remove insurance information in a patient record
- View, link and forward documents linked to a patient record
- Add, modify and remove contacts in a patient record
- Add, modify and remove consent information in a patient record
- Add, modify and remove lab orders from a patient record
- 25 • View and print lab result reports in a patient record
- Add and remove diagnosis codes in a patient record

Finding Patient Records:

Working with Patient Records: Patient Identifiers

The Identifiers page of the Patient Details window (not shown) lists identifiers which have been associated with the patient and allows the user to associate new identifiers with the patient. The system allows the user to link to a single patient record multiple identifiers that the user's organization and other organizations use to track the patient record, such as chart number, record number, test number and account number. For example, one facility may use Medical Record Numbers (MRNs) to keep track of its patients while another facility may use Patient Identification Numbers (PIDs) for the same purpose.

Working with Patient Records: Patient Employment Records

The Employment page of the Patient Details window (not shown) lists employment information for the patient, both past and present, and includes employer name, address, phone numbers, employment period and position. This page may be used to edit or enter new employment information for the patient.

Working with Patient Records: Patient Guarantors

The Guarantors page of the Patient Details window (not shown) lists the person(s) responsible for payment for any medical procedures not covered by a payer or a third party. A guarantor can be the patient, a parent/guardian, the patient's spouse, the patient's employer, or any other person financially responsible for the patient's medical expenses. This page may be used to edit or enter guarantor information for the patient.

Working with Patient Records: Patient Medical Data

The Medical Data page of the Patient Details window (not shown) lists data which the user's office and other organizations maintain for a patient. This page may be used to edit or enter medical data for the patient.

Working with Patient Records: Patient Insurance

The Insurance page of the Patient Details window (not shown) lists insurance information, both current and expired, for the patient, and includes insurance code, payer, insured name, policy/member number and effective dates. This page may be used to edit or enter insurance information for the patient.

Working with Patient Records: Patient Documents

The Documents page of the Patient Details window (not shown) lists all documents, such as X-rays, lab reports, and medical notes, that have been added to the patient's file either through the user's organization or other organizations. This page may be used to view the documents, change document links, or forward documents to different users.

Working with Patient Records: Patient Contacts

The Contacts page of the Patient Details window (not shown) lists persons who are contacts for the patient, and includes the contact's name, address, phone numbers and relationship to the patient. This page may be used to edit or enter contact information for the patient.

Working with Patient Records: Patient Consent

The Consent page of the Patient Details window (not shown) indicates whether there is a valid patient consent form on file for a particular patient record. This page may be used to edit or enter consent information for the patient.

Working with Patient Records: Patient Orders

The Orders page of the Patient Details window (not shown) lists all laboratory requisitions that have been prepared for the patient. To create a new standard requisition, the user can click Create New. The Requisition window appears with the General page

- Final reconciliation (certification) of suspected duplicate patients records
- Maintaining a persistent relationship between patient records in the GMPI
- Maintaining a reconciliation audit trail

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Patients: Link Duplicate Patient Records

The Link Duplicate Patient Records menu option of the Patients menu enables the user to link two patient records that are suspected of being duplicates of each other. When linking the records, one is designated as the lead record (also called a master
10 record) and the other the trailer of the lead record. Once linked, if the user selects the trailing patient record, the lead patient record will be opened instead. The dialog box shown in Figure 48 appears in order to notify the user that this has occurred.

The link established between the two records using the Link Duplicate Patient Records menu option may be referred to as a confirmed link. This confirmed link may
15 then be certified, e.g., by a GMPI administrator.

When the user selects the Link Duplicate Patient Records menu option, the Create Link Between Patients window appears, as shown in Figure 49. In the Patient A field, the user selects the first patient of the duplicate pair. In the Patient B field, the user selects the second patient of the duplicate pair. If the user wants Patient A to be the lead record,
20 the user clicks Confirm B into A. If the user wants Patient B to be the master record of Patient A, the user clicks Confirm A into B. The Confirm Link Dialog Box then appears, as shown in Figure 50. The user clicks Yes to confirm the link as described in the dialog box. A confirmed (directional) link between the records is then created, and the Created a Link dialog box appears.

25 An unresolved link occurs when a user is reconciling a duplicate pair through the Link Duplicate Patient Records and selects the "I do not know option". In this case, the link status changes from an unconfirmed link to an unconfirmed unresolved link. This link status is not visible to the user, but it will appear in the Suspected Duplicate Log under the Unconfirmed Link column. If the user selects a patient record with an

To find a patient record with links, the user chooses Reconcile Duplicate Patient Records from the Patients menu. The Finding a Patient with Links window appears, as shown in Figure 51. The user may select a pre-defined filter from the drop-down list next to the Filter field. The user may apply a custom filter by clicking Custom. The Custom Filter window appears, as shown in Figure 52. The user may then enter the filter criteria in the fields and click Apply to apply the filter and return to the Finding a Patient with Links window.

The result list appears, as shown in Figure 51. To sort the list, the user can move the mouse pointer over the heading of the column to sort on and click. The search results list is sorted in ascending order using the selected column as the sort criteria.

To print the list, the user clicks Print List. Figure 53 illustrates a Print Preview window.

To reconcile a patient record, the user highlights the desired record and clicks Continue. The Finding a Patient with Links table appears, as shown in Figure 54. To reconcile duplicate patient records, the user highlights a Duplicate patient record to reconcile with the selected patient record and clicks Reconcile.

In response, the Reconcile Patient Duplicate dialog box appears, as shown in Figure 55. The dialog box includes a statement at the top indicating which patient record is currently designated as the Potential Duplicate and which patient record is designated as the Selected Patient.

To make the Selected Patient the leader record of the Potential Duplicate, the user chooses “Yes. Make Selected Patient the new Master record”.

To make the Potential Duplicate the leader record of the Selected Patient, the user chooses “Yes. Make Duplicate # the new Master record”.

If the records are not duplicates, the user chooses “No. they are not duplicates”.

To certify the association between the Selected Patient and the Potential Duplicate, the use chooses “Certify the association between the Selected Patient and the Duplicate #.”

To denigrate the association between the Selected Patient and the Potential Duplicate, the user chooses “Dissolve the association between the Selected Patient and the Duplicate #”.

To terminate reconciling the two patient records, the user clicks Cancel.

To view the details of a patient, the user highlights the column containing the patient to view and clicks View Details. The Patient Details window appears.

To show the identifiers for each patient, the user clicks Show Identifiers. The list "jumps" to the fields containing the identifiers for the patients.

To view a graphical representation of the table, the user clicks Graphical. In response, a graphical representation window appears, as shown in Figure 56. The user can click and drag a patient-bubble across this window. To view details of the patient record, the user can double-click on a patient-bubble and select View Details from the menu that appears. To reconcile a patient record, the user can double-click on a patient-bubble and select Reconcile from the menu that appears. To return to the Finding a Patient with Links table window, the user clicks Back. To print the Finding a Patient with Links table window, the user clicks Print.

Patients: Manage Patient Groups

The Manage Patient Groups menu option enables the user to create patient categories that are identified by a code and to sort patients into these various categories. Examples of patient groups are "High HDL Cholesterol Group", "Diabetes Control Group", and "E. Coli Testing". Patient Groups with Report Groups are used to generate Results Summary Reports and Cumulative Reports. Information obtained from these reports can be used to schedule patient visits in advance, gather valuable statistical information and identify trends in a patient population.

When the user choose Manage Patient Groups from the Patients menu, the Patient Group Management window appears, as shown in Figure 57. From the Manage Patient Groups menu option the user can:

- List all patient groups
- List all the patients in a patient group
- Create New patient groups
- Add a new patient to a patient group
- View a patient group

order. A header page is a configurable option. The header pages shows: Date and time of the report, Name of the user running the report, Comment line, and Search criteria used to generate the report.

To generate the Patient Group Listing, the user selects Patient Group Listing from the Patients menu. The Patient Group Listing window appears, as shown in Figure 59. The user then enters criteria for generating a patient group listing. Figure 60 illustrates a Patient Group Listing Print Preview window for previewing a report.

User Module

In one embodiment, there are four basic functions to the User module of The system:

- Change Active HDN Business
- Change Password
- Manage Preferred Lists
- View Documents

These functions are accessed through the User menu, as shown in Figure 61, or the User desktop menu. The User functions are described below. Before discussing these functions, a brief overview of security considerations is given.

Security Considerations in The system

The system provides the ability to secure information across a large and open network of computers and the people that use them. This network is referred to herein as a Health Data Network, or HDN. The security of this network, including access to it, is critical because the system provides access to confidential patient information, including laboratory test results and medical history.

User Accounts – Before the user can log on to the system, the user must have a user account including a logon name and a password. The user account provides the needed security for controlling access to the HDN and identifies the user while the user is using the system.

5 HDN Businesses – When the user log on to the system, the user connects to the system on behalf of a Health Data Network (HDN) Business. An HDN Business is any business, including a hospital, clinic, physician office, laboratory, payer, or employer, that participates in the creation and sponsorship of a specific HDN.

10 Through the user's user account, the user is linked with HDN Businesses. The user may be allowed to log on to the system on behalf of more than one HDN Business. For example, the user's primary HDN Business may be the office in which the user is currently working, but there may also be times when the user may need to access the system on behalf of a hospital where the user has patients in order to check on their status. In this case, the user may be linked to both HDN Businesses, the user's office and
15 the hospital.

Parent-Child HDN Businesses – If the user's practice has more than one location or business unit, and all orders and results are shared throughout the practice, the user's practice may be configured as a single HDN Business. In this case, the practice's data may be stored in a central location and can be accessed by all users who have the
20 appropriate permissions.

However, if the user's practice has more than one location or business unit, and the need exists to keep orders and results isolated within a location or business unit, the practice may be configured in a parent-child HDN Business relationship. This prevents lab orders and results and other data associated with one location or business unit from
25 being accessed by users logged on to other locations or business units of the practice.

1. A parent HDN Business is created for the entire practice.

2. Child HDN Businesses are created for each business unit or location. Some business units or locations may actually share a single child, while others may be set up as individual child HDN Businesses.

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Permissions, Roles, Operations and Objects

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creating a limited period of time when that permission profile is in effect. This can be

criteria for determining whether a password is a valid password, depending on how an organization has configured this function.

5 User: Manage Preferred Lists

Preferred lists are a time saving feature that enable the user to carry out repetitive tasks more efficiently. The Manage Preferred Lists menu option of the User menu provides a means to carry out various recurrent tasks quickly without having to go through multiple screens and numerous keystrokes. In one embodiment, the system enables the user to set the user's own preferences for:

- Caregivers
- HDN Businesses
- Payers
- ICD Diagnosis Codes
- ICD Procedure Codes
- CPT Codes and
- Test Codes

The system enables the user to maintain and modify these preference lists to suit the user's own requirements. Setting up preference lists helps the user streamline many tasks the user does within the application. The following is a sample of some common repetitious tasks that the user can be simplified by using preferred lists:

- Creating Requisitions
- Generating Lab Reports
- Entering Insurance Information for a Patient

In the Preferred List Manager window, shown in Figure 64, two separate lists appear side by side. On the left side of the screen, there is a list of Available items. On

the right side of the screen, there is a list of Preferred items. New entries can be added to both lists.

From the Manage Preferred Lists menu option the user can:

- Retrieve a preferred list.
- 5 • Add items to a preferred list
- Modify items on the user's preferred list
- Remove single or multiple items from the user's preferred lists
- Apply a Custom Filter to narrow down the user's search results
- Get Details on any preferred list item
- 10 • Print a preferred list

Shared Lists – The user can view the preferences of another user at the user’s HDN Business or at another HDN Business and use items from their existing preferred lists to create the user’s own list. There are two types of preferences: shared and individual. For example, in the case of caregivers, the user can have a My Caregivers preferred list and a Shared Caregivers preferred list.

Under the My Caregivers preferred list, a user may include those caregivers that only that user uses on a regular basis. Under the Shared Caregivers preferred list, the user may include those caregivers that are accessed by that user as well as other users associated with the active HDN Business. The user can have two types of preferred lists for other categories as well (HDN Businesses, Payers, ICD, CPT and Test Codes, etc).

Each HDN Business can set up its own list of preferences and make this list accessible to all users at that HDN Business. A user can have a different preferred list of items for every HDN Business the user has access to.

25 When the user displays a preferred list, the shared and individual lists may be combined and sorted in various ways, depending on what type of data the lists contain. For example, lists of caregivers, HDN Businesses, and payers maybe sorted in

alphabetical order, whereas lists of ICD, CPT and test codes may be sorted numerically by code. Each item on a list may also have a descriptive comment next to it.

Users may own their preferred lists so that the entries a user makes to the user's preferred lists can be deleted only by that user. The HDN Business user preferences are accessible to all the users at that HDN Business. In one embodiment, they can be modified or deleted by any user at the HDN Business. Preferences may be linked to the user's account rather than to the user's workstation. Thus, the user can view the same preference lists regardless of the workstation used to access the system.

User: View Documents

An HDN business typically sends, receives, and stores many reports and other documents. Although these documents are often generated electronically by the various participants in the delivery of healthcare services for a patient, including health care providers, hospitals, labs and payers, the documents are traditionally printed and distributed by a number of different manual delivery methods, such as interoffice mail, facsimile, US Mail, or some other physical delivery method.

The View Documents menu option of the User menu provides instant, two-way, electronic communication between the various participants in the delivery of healthcare services for a patient. Documents, such as those described previously, can be linked to a user or list of users and then listed on their User Document List, shown in Figure 65. From the user's User Document List, the user can:

- View the document
- Link the document to a patient record
- Forward the document to another user or group of users

Documents that are not generated electronically or are from a source not participating in the Health Data Network (HDN), such as an employer, can be faxed into

the user's system and then linked to a user or list of users. The faxed document is then treated like any other document generated electronically within the HDN.

The following table provides definitions for the columns on the User Document List window:

5

<u>Column</u>	<u>Description</u>
Category	The document category
Date Created	The date the document was created
Document Source	The source of the document
10 Document Type	The type of document
From	The user who forwarded the document to the user
Linked To	The person to whom the document is linked
Status	The read status of the document. A "U" indicates that the document is unread
15 Urgent	An exclamation point ("!") indicates an urgent document

Figure 66 illustrates a window for applying a custom filter to the User Document List.

Figure 67 illustrates a window for viewing a user document.

20

Figure 68 illustrates a window for editing the link for a user document.

Figure 69 illustrates a window for forwarding a user document to one or more users.

Admin Module

25

Tasks carried out in the application comprise administrative as well as user tasks. Administrative tasks are found on the Admin menu, as shown in Figure 70, which includes a Site Configuration option and the following five submenus:

- Manage Businesses
- Manage Security

- Manage Health Care Codes
- Manage Resources
- Manage System Integration

It is noted that some or all of the functions accessible via the Admin menu may be restricted for use only by users with administrative privileges. Thus, in the following descriptions of the Admin menu options and submenus, the term “the user” may refer to administrative users.

Admin: Site Configuration

Before using the Admin menu options to configure the user's site, it is important to have an understanding of Health Data Network (HDN) Businesses, and how they relate to other system components. The user must also understand the concept of parent-child relationships in order to successfully maintain the user's site.

In the preferred embodiment, the system can interface to multiple labs simultaneously and seamlessly. The Site Configuration option in the Admin menu enables the user, e.g., an administrator, to support and manage this feature and provides the user the functionality needed to define relationships between the user's site and several laboratories.

When selected, the Site Configuration window appears with the General page active, as shown in Figure 71. This page is used to specify HDN Business level interface settings that affect how the system works.

The Lab page, shown in Figure 72, is used to define and maintain information on provider-lab associations. Before an order can be sent from a Provider HDN Business, that business must have at least one lab association and one client ID for that association. From this page, the user can carry out the following functions:

- Create, configure and maintain associations between a provider and multiple labs

- View and/or modify detailed lab information
- Create Client IDs for each provider-lab association
- View and/or modify information on existing Client IDs
- Print configuration data, lab association information and Client IDs for a provider

5

Site Configuration - General Page

As described above, a user's practice may be configured as a parent-child HDN Business relationship. To modify the configuration data of the table shown in Figure 71, the user may log in to the parent HDN Business. A message appears at the top of the page in Figure 71 indicating the name of the HDN Business the user is currently viewing.

When the user views a child HDN Business, the configuration data that appears on the screen may be that of the parent HDN Business. In one embodiment, any configuration data defined at the parent level cannot be modified at the child level. When viewing information for a child business, any parent-specific data may appear grayed out on the configuration table so that the data cannot be modified. As described above, individual HDN Businesses may have their own policies regarding what permissions a user can have. Thus, a Business may define a policy such that only administrators are allowed to define or modify configuration information.

The following table explains the fields on the General page of the Site Configuration Details window:

<u>Field Name</u>	<u>Definition</u>
Account Path for PMS Interface	The account path for a Practice Management System (PMS) interface.
Baud rate for PMS Interface	The baud rate for the PMS interface.
Client Type	The client type.

The number of databits for the PMS interface.

Default Bill Type

The default bill type. Includes drop-down list values of: Client, Patient or Third Party. The value selected appears as the default Bill Type when creating a requisition.

Interface for the PMS System

The interface for the PMS system.

Months before results

The number of months before results are ready to be archived.

Parity for PMS

Interface

The parity for the PMS interface.

Patient Label Barcode Format

Indicates the method used for encoding information in the patient label bar code.

PMS Check Required

This box tells the system to search for patient records in the Practice Management System

Port for PMS Interface

The port for the PMS interface.

Print Patient Label

Indicates whether patient labels are printed. If this box is selected, a label is printed when a requisition is created, as long as a label printer is attached to the workstation where the requisition is created. Labels are placed on specimens for identification purposes.

Refresh Results Statistics

Frequency (hours)

The frequency at which the results statistics in the main screen status bar are updated. (Not Viewed Results, Abnormal Results)

Single User Site

Indicates if the site is a single user site.

Stopbits for PMS

The number of stopbits for the PMS interface.

fields on the page as needed. The following table explains the fields found on the Lab Association Configuration window:

	<u>Field Name</u>	<u>Definition</u>
5	Allow manual requisition	If this box is selected, manual requisition numbers numbers can be entered when creating a requisition. Otherwise, each new requisition uses a number generated by the system.
10	Eligibility results rechecked after delay of (hours)	This field applies primarily to Future requisitions. If eligibility has been verified for a requisition, patient or insurance within the specified number of hours, it will not be re-checked. Otherwise, it will be verified again.
15	Exclude Bill Type	A drop-down list with possible values of Client, Patient or Third Party. If a value is selected then that Bill Type cannot be used when creating a requisition.
20	FDA check required	When this box is selected, if Bill Type is Third Party and the patient has a limited coverage policy, such as Medicare, and a non FDA-compliant test code is used in a requisition, the ABN Dialog box appears. An Advanced Beneficiary Notice (ABN) is a printed statement that includes a list of tests not covered by the payer.
25	HDN Business	The Provider HDN Business being linked to a lab. Also, the currently active HDN Business. This is a read only field and cannot be modified.
	Lab	The Lab associated with the Provider. This is a read only field and cannot be modified.

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Maximum requisition
number

10

15

Selec Test Only
Specificity check
required

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A unique identifier assigned to each site. This field is used during the process of uploading and downloading results. Multiple client IDs may map to the same transfer ID.

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In the Client IDs section of the Lab page the user can perform the following

15 functions:

- Create Client IDs for each provider-lab association
- View and/or modify information on existing Client IDs
- Print information on Client IDs

	<u>Field Name</u>	<u>Definition</u>
25	Caregiver	This is the name of the physician to whom the provider client ID is assigned. If no physician is selected, the client ID is defined for the provider.
	Client ID	The lab assigned identifier for the provider.

5

The lab associated with the provider. This field cannot be modified.

The name of the provider to whom the client ID is assigned. This field cannot be modified.

15

20

A party responsible for paying the lab bill, usually a commercial health insurer or government agency that underwrites or administers programs that pay for health services.

An institution or individual that gives medical care.

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Admin: Manage Businesses: Employers

Although the employers of patients, insured parties, and guarantors are not directly involved in the delivery of healthcare, they are part of the business structure. Using the Employer menu option of the Manage Businesses submenu, the user can carry out the following functions:

- Create new employer records
- View and/or modify existing employer records
- 10 • Print employer records details •
- Delete employer records
- Print lists of employers

Once created, employer records can then be linked to patient, insured party and guarantor records.

Admin: Manage Businesses: Labs

A lab may be an organization that provides clinical testing and/or observation services. Using the Labs menu option of the Manage Businesses submenu, the user maintains information on the labs the user does business with. This information may be used by functions accessed via the Orders menu, which include utilities used to prepare and submit requisitions. In the Labs subsystem, the user can carry out the following functions:

- 25 • Create new lab records
- View and/or modify existing lab records
- Print lab records details
- Delete lab records

- 00000000000000000000000000000000**

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Mnemonic

Max diagnoses per test

5 Max tests per requisition

Max copy to per requisition

10

Copy to electronic only?

15

Print Specimen Barcode

Specimen Barcode Format

20

Requisition Report Format

Single Result Report Format

25 Logo Filename/Path

Transfer ID Format

The default Host System Identifier for a Payer.

The maximum number of diagnosis (ICD-9) codes allowed per test.

The maximum number of test codes allowed in a requisition.

The maximum number of Caregivers to receive copies of a requisition. This field affects the list of caregivers in the Additional Info page of a requisition.

This check box affects the physician results list in the Additional Info page of a requisition. If this box is checked, the search only returns caregivers that have Client IDs. Otherwise, the search returns all caregivers that meet the user's search criteria.

This check box determines whether a specimen bar code is printed when a requisition is created.

Defines the method used for encoding information in a bar code. A value may be selected from the drop-down list.

Defines the requisition report format. A value may be selected from the drop-down list.

The format of a typical result report. A value may be selected from the drop-down list.

This is the file name and location of the logo image that appears on a requisition.

Specifies the transfer ID format. (X means any alphanumeric character is allowed, N stands for

To access the Child Labs page, the user clicks Child Labs on the Lab Details window. In response, the Child Labs window appears, as shown in Figure 78. The Child Labs page lists the children of a parent lab. This relationship is established when a Parent lab is selected for a child lab on the Lab page of the Lab Details window. When the user views a parent lab that has children labs, the Child Labs page is active and it includes a list of all the children labs. When the user views a parent lab that has no children labs, the Child Labs page is active, but no labs are listed.

From the Child Labs page, the user can carry out the following tasks:

- View details of existing child labs
- Modify detail information of existing child labs
- Modify the parent-child relationship between two labs

To access the Payers page, the user clicks Payers on the Lab Details window. In response, the Payers window appears, as shown in Figure 79. Payers can have contractual agreements with some labs, wherein if the lab work for a patient is sent to a contracted lab, there is a financial benefit to be gained by the payer. The lab-payer associations are typically defined at the parent lab level, but the system does not restrict it to this level. The association between labs and payers is managed through the Payers page of the Lab Details window. The Payers page includes a list of payers associated with a lab that may be checked for eligibility if electronic eligibility is enabled.

From this page, the user carry out the following tasks:

- Associate existing payers with labs
- View details of existing payers
- Remove existing associations between payers and labs

Admin: Manage Businesses: Payers

A payer typically refers to an insurance company, but it can mean any organization, such as an employer or government agency, that pays for medical services provided to a patient. A payer is different than a guarantor. The guarantor is the person ultimately responsible for payment of the medical bill. For example, if the insurance company does not cover medical charges, the guarantor, which is usually the patient or the patient's guardian, is responsible for payment.

Using the Payers menu option of the Manage Businesses submenu, the user can carry out the following functions:

- Create new payer records
- View and/or modify existing payer records
- Print payer records details
- Delete payer records
- Print lists of payers

In addition to basic demographic information, each payer record may include the following information:

<u>Information Type</u>	<u>Definition</u>
Providers	Providers and caregivers for whom the payer will cover medical expenses.
Service	Services on the network that the payer participates in.
Billing	Lab-defined billing IDs for the payer.
Insurance Code	A user defined value used to identify a payer.
Labs	The labs for whom the payer will cover medical expenses.

Because the number of payers stored on the user's system may be very large, the user can create a list of preferred payers as described above. The Preferred List of Payers

identifier used to designate a payer. Each site can have more than one insurance code to designate the same payer. Management of payer-insurance codes is carried out through the Insurance Code page of the Payer Details window.

Figure 85 illustrates the Labs page of the Payer Details window. The Labs page shows all the labs associated with the active payer. These labs are considered payer-approved labs. Payers can have contractual agreements with some labs wherein if the lab work for a patient is sent to a contracted lab, there is a financial benefit to be gained by the payer. For each lab-payer set, each provider HDN Business can specify which lab in the set is their preferred one to use.

When creating a requisition, the user may choose what lab to send the order to. For patient and client billing, the lab may default to the default lab for the ordering provider HDN Business, although a user can choose from any lab associated with the provider. For third party billing, the payer is chosen first then the lab defaults to the payer preferred lab if one exists, then to the HDN Business level default lab if that lab is in the payer-lab list, or to nothing if neither of these conditions apply. Again, the user can choose any of the labs setup for the Provider HDN Business and override any default labs.

The association between labs and payers is managed through the Labs page of the Payer Details window. From this page, the user can carry out the following tasks:

- Associate existing labs with a payer
- Designate a lab-payer combination as preferred
- Remove existing associations between labs and payers

Admin: Manage Businesses: Providers

A provider is any organization that supplies health care-related services, such as a hospital, clinic, lab, diagnostic center, etc. Using the Providers menu option of the Manage Businesses submenu, the user can maintain information on the Providers in the user's network. In the Provider subsystem, the user can perform the following functions:

10	<u>Information Type</u>	<u>Definition</u>
	Caregiver	Caregivers associated with the provider
	Client IDs	Physicians' client IDs for particular labs
	Specialties	Specialties of the provider

Figure 87 illustrates the Caregiver page of the Provider Details window. A caregiver is a person who provides health care services to patients. Physicians, nurses, technicians, and physician's assistants are all examples of caregivers. In the business of healthcare, caregivers are typically associated with providers. The management of this association is carried out through the Caregiver page of the Provider Details window. From this page, the user can carry out the following tasks:

- Associate existing caregivers with providers
- View details of existing caregivers
- Remove existing associations between caregivers and providers.

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User Accounts	Information about the people associated with an HDN Business who access the system.
HDN Businesses	Businesses connected to the Health Data Network.
Realms	Collection of security roles and permission profiles.
Permission Profiles	General grants of access given by an owner to a user.
Security Roles	Groups of operations that are typically related to a specific function or position.

After the user make changes to the security system, the user may update the users
10 and realms through a Make Security Changes Effective menu option.

Security Checks – One important feature of the system is the secure exchange of information across a possibly very large and open network. To accomplish this, the system may check the following aspects of a user account before allowing the user to

15 carry out a function:

Security checks the...

Which is a...

Task that a user carries out on the data stored on the HDN. Operations may be global to the entire HDN.

Collection of typically related operations.

Permission Profile

Realm

25 Roles and Permissions – In the preferred embodiment, the security system is based on roles and permissions. These two concepts, combined with ownership, determine a user's authorization level, or the operations the user can carry out. A role is a group of operations that is typically related to a specific function or position. For example, various roles may be defined for physicians, nurses, office assistants, etc., or for

any other function or position that a business desires. Roles limit transaction access to certain groups of users. For example, roles can be used to deny access to transactions related to clinical results except for people whose job requires that they have access. Only people with an approved need to know should be assigned roles that have search and read capabilities on patient information. The system users are classified and their permissions are assigned based on pre-defined security roles.

A permission profile is created from a role. The permission profile specifies the role's clearance level, effective date, expiration date, owner, and what realm it belongs to.

A realm refers to a collection of roles and permission profiles. Usually the realm owns the permission profile, but it can also be owned by a user.

Admin: Manage Security: User Accounts

Users are people associated with one or more HDN (Health Data Network) Businesses who access the system, such as caregivers, physicians, staff members, and administrators. The User Accounts menu option of the Manage Security submenu may be used to manage information regarding the HDN Businesses a user is linked to and the permissions assigned to the user for a specific HDN Business.

Prior to adding users or modifying user information, an administrator may initialize the security system by creating a realm, business entity, roles, permissions, etc. Users may then be added and assigned to HDN Businesses with specific permissions. The User Accounts menu option enables access to the following information:

<u>Select this page...</u>	<u>To see...</u>
General	User attributes and information used to verify the user's identity
HDN Business	Status, active or inactive, of the selected user for the HDN Businesses listed
Permissions	Permission profiles for roles assigned to the user

Figure 91 illustrates the General page of the User Account Details window. The General page includes fields specifying general information regarding a user account.

Figure 92 illustrates the HDN Business page of the User Account Details window. HDN Businesses are associated with a user by clicking Add and then finding an HDN Business. The HDN Businesses page also shows the status (active or inactive) of the selected user for the HDN Businesses listed. To activate an inactive account, the user highlights the account and clicks Activate. To deactivate an active account, highlight the account and click Deactivate.

Figure 93 illustrates the Permissions page of the User Account Details window. A permission is a general grant of access given by an owner to another user. A permission comprises an owner identifier, a user identifier, and a role identifier. Each permission may be mapped to a clearance level.

15 Permission profiles are assigned to users for a specific HDN Business. Users can have the same or different permission profiles with different HDN Businesses. The Permissions page shows the permission profiles for roles assigned to the selected user.

Figure 94 illustrates the Site ID page of the User Account Details window. A Healtheon Practice site can be any health care entity, such as a caregiver, hospital department, or hospital. The site definition depends on the user's contractual agreement with Healtheon for using the Healtheon Practice system. The Site ID page contains a list of site IDs that the user can assign to the selected user. The user then has access to information at the specified Healtheon Practice site. The user set up the site IDs using the Site ID subsystem of the Manage System Integration option.

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Admin: Manage Security: HDN Businesses

A Health Data Network (HDN) Business is any business connected to the Health Data Network. An HDN Business may or may not share data with other HDN Businesses. Using the HDN Businesses menu option of the Manage Security submenu,

the information regarding the HDN Businesses in the Health Data Network may be managed. The HDN Business Details window provides access to the following information:

5	<u>Select this page...</u>	<u>To see...</u>
	General	Specifics where the business fits in the network
	Contact	Entity representatives
	Billing	Reference and tax identification
	Users	Attributes and identity verification
10	Configuration	Network participation

When a new HDN Business is created, it may be linked it to a Global Location. This is referred to as assigning a data slice to an HDN Business. There is a field on the HDN Business General page called Data Server. By selecting one of the data servers on the list the user link the HDN Business to a Global Location.

The following table explains the fields on the General page of the HDN Business Details window, shown in Figure 95:

20	<u>Field Name</u>	<u>Definition</u>
	Data Server	The data server where the data for the HDN Business is stored.
	HDN Business Link	The business that is linked to this HDN Business. The type of business is determined by the value in the HDN Business Type field. On windows and printouts that include an address, such as a Requisition, the address from the linked business is used.
25	HDN Business Name	The name of the HDN Business.

Figure 96 illustrates the General page of the Realm Details window. The General page includes fields for entering a name and description for a realm.

Figure 97 illustrates the HDN Businesses page of the Realm Details window. The HDN Businesses page lists the HDN Businesses linked to the selected realm. If the HDN Business is a sub-business of another, the parent business entity is also listed. From this window, the user can carry out the following tasks:

- Create New HDN Businesses that are automatically associated with the active realm
- Get Details of an existing HDN Business the is associated with the active realm

Figure 98 illustrates the Permission Profiles page of the Realm Details window. The Permission Profiles lists the permission profiles associated with a realm. From this window, the user can carry out the following tasks:

- Create New permission profiles that are automatically associated with the active realm
- Get Details of an existing permission profile the is associated with the active realm

Figure 99 illustrates the Roles page of the Realm Details window. The Roles page lists the roles associated with a realm. From this window, the user can carry out the following tasks:

- Create New security roles that are automatically associated with the active realm
- Get Details of an existing security roles the is associated with the active realm

The Users Online page of the Realms Details window lists the users currently online who have roles associated with the specified realm.

PREFACE

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Defined roles may be available for permission assignment by any and all realms in the network. Roles defined locally by a realm may be available for permission assignment on that realm only.

Figure 101 illustrates the Security Role Management window. From this window the user can:

- filter the Security Role Management list
- print the Security Role Management list
- create a new security role
- display details of an existing security role
- create a permission profile for the highlighted security role
- update the security roles

Figure 102 illustrates the Security Role Details window for specifying or viewing details of a particular role. A security role comprises objects and the operations that can be carried out on those objects. The Security Role Details window has two panels, each with two lists. The top list in the left-hand panel displays all available objects. When the user clicks on an object, the list of operations that can be carried out on those objects appears in the list at the bottom of the panel. The top list in the right-hand panel displays all objects which have been assigned to the security role. When the user clicks on an object, the list of operations which can be carried out on that object that have been assigned to the security role appears on the list at the bottom of the panel.

To assign object-operations to a security role, the user clicks on an object in the Available panel and then selects the desired operations that users with this role should be able to carry out on that object. Clicking Add assigns the object-operations to the security role.

Admin: Manage Security: Make Security Changes Effective

Using the Make Security Changes Effective menu option of the Manage Security submenu, the user updates users and realms with changes that have been made to the security system, such as creating a new user or changing a user password. If this function is not performed, then the next time a user logs on to the system, the changes may occur anyway.

Admin: Manage Health Care Codes

Various sets of health care codes may be used throughout the system, as shown in the following list.

- CPT-4 codes
- ICD-9 codes
- Specialties
- Analyte codes
- Profile codes
- Report codes
- Test codes

Code sets are accessed through the Manage Health Care Codes menu option of the Admin menu.

Analyte Codes – An analyte is the smallest unit or component for which a laboratory test is performed. A laboratory test may include multiple analytes. For example, a CBC (complete blood count) is a single test that includes multiple analytes. Analyte codes may be specific to a lab, and may be pre-loaded into the system. As updates become available, these may also be loaded into the system automatically, with no action required on the part of the user. Using the Analyte Codes function, the user can find and print codes. Analyte codes are used for viewing and reporting on results.

stored on the user's system may be very large, the user can create lists of preferred diagnosis and procedure codes, i.e., those codes that the user frequently uses. This makes locating an ICD-9 code much easier and faster.

5 Profile codes – Profile codes are used for both requisitions and for results. In requisitions, a lab profile includes multiple individual tests, which can be ordered collectively as a profile or individually as needed. In results, a lab profile includes multiple report codes and may include a panel, i.e., multiple tests that have the same report code. Profile codes may be specific to a lab, and may be pre-loaded into the system. As updates become available, these may also loaded into the system automatically, with no action required on the part of the user. Using the Profile Codes function, the user can find codes and print lists of codes. Profile codes are used by both functions accessed from the Orders menu and functions accessed from the Results menu.

Report Codes – A report code identifies the results of a laboratory clinical test. It differs from an order code in that an order code is the test code used to send an order, and a report code is the code used to return results. A collective set of multiple report codes is referred to as a lab profile. Report codes may be specific to a lab, and may be pre-loaded into the system. As updates become available, these may also loaded into the system automatically, with no action required on the part of the user. Using the Report Codes function, the user can find codes and print lists of codes. Report codes are used by the functions accessed via the Results menu for viewing and reporting on results.

Specialty List – Specialties define the specific area of medicine or focused
25 approach to health care that a provider or caregiver supplies. Using the Specialty List
function, the user may create the specialties that are used throughout the system. Once
created, these specialties can then be linked to provider and caregiver records.

- Creating new caregivers
- Maintaining information on existing caregivers
- Deleting existing caregivers
- Printing lists of caregivers

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Admin: Manage System Integration

System Integration refers to a group of settings that affect certain aspects of the system. These settings fall within four main categories that the user can manage using the corresponding menu options in the Manage System Integration submenu:

<u>System Aspect</u>	<u>Menu Options</u>
15	Code Sets
	Local Codes
	Global Codes
15	Code Translations
	System Identifiers
	HDN Business-Specific Identifier Types
15	Site IDs
	Document Storage
	Document Routing Configuration
20	Documentation Distribution Lists
	Network Configuration
	Network Configuration

From the Manage System Integration submenu, the user can define and maintain the codes, identifiers, and rules related to these four areas.

25 Code Sets

The user may define and maintain the user's own code sets, such as groups of values or symbols used to represent information such as a patient's employment status, religion, marital status, etc. These values usually appear in drop-down lists from which

the user makes a selection. To handle the code sets, the system may be operable to map and translate global and local codes. Global codes refer to user-defined codes that are used uniformly across the entire network (hub). Local codes refer to user-defined codes that are specific to a certain HDN Business.

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Code Translation

The Code Translation function provides a mechanism for translating codes between different HDN Businesses. Using the Code Translation function, the user can map system codes to HDN Business codes. The purpose of code translations is to support network participants having different sets of valid values for the same field and to provide a mapping from one participant's representation to that of another participant's representation.

For example, suppose that two hospitals, A and B, are participants in the same network. Hospital A has three Patient Type codes: IN for inpatient, OU for outpatient, and OT for other. Hospital B has four Patient Type codes: I for inpatient, O for outpatient, E for emergency, and B for Obstetrics. Through the Code Translation function, both participants can maintain their existing coding systems. The system automatically translates and converts codes when data is shared between participants. Code translation lets a participant receive data from another participant and view that data in their own native domain set using their own coding systems, regardless of who owns the data.

The idea behind code translations is to provide for each code type, such as relationship code type and religion code type, a set of:

- The system codes
- HDN Business codes (if a network participant wants their own set)
- Mappings for inbound and outbound translation

The Code Translations menu option provides access to the following information:

To see...

Inbound and outbound translations for the code type that the user select

Set of The system codes for the code type that the user select

Set of HDN Business codes for the code type that the user select

The General page of the Code Translations subsystem lists inbound and outbound code translations. Inbound and outbound translations differ based on whether the code is being translated from a system source or HDN Business source. The following table describes these two types of code translation:

<u>Code Translation</u>	<u>Definition</u>
Inbound	Mappings from HDN Business codes to system codes
Outbound	Mappings from system codes to HDN Business codes

Each system code may map to exactly one code in each defined HDN Business code set. This makes outbound translation possible. Each HDN Business code may be mapped to exactly one system code value. This makes inbound translation possible. The system set of codes within a code set may include a superset of all possible code descriptions that might be used by any HDN Business set in the network.

The System Codes page of the Code Translations subsystem lists the set of system codes for the code type that the user selects, such as MS for marital status. The system codes then appear in the Outbound section on the General page. For example, the system marital status codes appear on the System Codes page after the user selects MS as the code type. If the user clicks the General page button to see the General page, the system marital status code set appears in the Outbound section of the General page.

The HDN Business Codes page of the Code Translations subsystem lists the set of HDN Business codes for the code type that the user select, such as MS for marital status. The HDN Business codes then appear in the Inbound section on the General page. For example, the system marital status codes appear on the HDN Business page after the user
5 selects MS as the code type. If the user clicks the General page button to see the General page, the HDN Business-specific marital status code set appears in the Inbound section of the General page.

System Identifiers

10 A system identifier is a string of characters used as a label, such as BAN for Billing Account Number. There are two categories of system identifiers: Caregiver and Patient. The Registration flag is used by the identifier labels Insurance Code and Patient Account. Each HDN Business may define one registration label for each type (Caregiver, Patient or Payer). For example the registration label for Payer type may be Insurance
15 Code and the registration label for Patient Type may be Patient Account. Because identifiers are categorized, only the patient identifiers appear in the Patient subsystem. These categories are used to store IDs originating from external systems such as Practice Management Systems. These identifiers help distinguish between the various types of account numbers. Identifiers might also be used to distinguish between types of payer
20 account numbers or types of caregiver certificate numbers.

Document Storage

Medical personnel and related administrative staff receive many reports and other documents in paper form. Often, these are generated electronically by various systems,
25 then printed and distributed by a manual delivery method. In the preferred embodiment, the system allows its participants to automatically receive electronic images of printed documents that would otherwise have to be received through interoffice mail, fax, US Mail, or some other physical delivery method. The Document Routing Configuration

Patient Evaluation

Financial

Payments From Patient

Billing

5 Document Distribution Lists

 A document distribution is like a document routing in that it uses rules to automatically distribute electronic documents that have been routed to a specific user. Documents distributed by these rules are then accessed through the View Documents function of the User menu. However, unlike a routing, which only allows the user to automatically send a document to a single user, document distribution allows the user to create a list of users to whom a single document is sent.

 The Document Distribution Lists function allows the user to create general distribution rules for a "routed to user" by selecting a system-defined category of documents and then selecting users to whom electronic documents of the selected category are distributed. The user can also create document-specific distribution rules for a "routed to user" by selecting a document type and then selecting users to whom electronic documents of the selected type are distributed.

 Although the embodiments above have been described in considerable detail, numerous variations and modifications will become apparent to those skilled in the art once the above disclosure is fully appreciated. It is intended that the following claims be interpreted to embrace all such variations and modifications.